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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,111	10/31/2003	Michael Harville	200310949-1	8918

22879 7590 06/04/2009

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EXAMINER	
KRASNIC, BERNARD	

ART UNIT	PAPER NUMBER
2624	

NOTIFICATION DATE	DELIVERY MODE
06/04/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/698,111	HARVILLE, MICHAEL	
	Examiner	Art Unit	
	BERNARD KRASNIC	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9-39* is/are rejected.

7)☒ Claim(s) *8 and 40* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. The amendment filed 2/27/2009 have been entered and made of record.

2. The application has pending claim(s) 1-40.

3. In response to the amendments filed on 2/27/2009:

The "Claim rejections under 35 U.S.C. 101" have been entered because applicants arguments filed on 2/27/2009 on pages 11-12 [Section 35 U.S.C. 101] are persuasive and therefore the Examiner withdraws the rejections under 35 U.S.C. 101.

The "Claim rejections under 35 U.S.C. 112, first paragraph" have been entered because applicants arguments filed on 2/27/2009 on pages 12-13 [Section 35 U.S.C. 112] are persuasive and therefore the Examiner withdraws the rejections under 35 U.S.C. 112, first paragraph.

4. The Applicant's arguments with respect to claims 1-40 have been considered but are moot in view of the new ground(s) of rejection because the Applicant has amended independent claim(s) 1, 23, and 32 [e.g. "depth data for at least a pixel of an image of an object, *which is not required to be inside of a subject*].

5. Applicant's arguments filed 2/27/2009 have been fully considered but they are not persuasive.

The Applicant alleges, "The Office Action cited lines 1-5 of 0041 ..." in page 14 through "Claims 2-22 depend on independent ..." in page 16, and states respectively that the Applicant understands Mahbub to require view images that are not from above [e.g. front views and side views] and therefore for at least this reason claim 1 is patentable. The Examiner disagrees because Mahbub in paragraphs [0040]-[0042] and [0056] states that at least one imaging device of the 3-D imaging system provides image data and this 3-D imaging system can be located at a variety of locations [e.g. 1. headliner, 2. pillar, 3. dashboard, the Examiner is considering only one is used because "at least one" is stated]; Mahbub is suggesting different location alternatives from where the 3-D image data may be produced and therefore the Examiner is considering Mahbub's plan-view image to be the segmented 3D image from the headliner location [headliner has a fixed overhead location and a fixed overhead orientation] because the headliner above the rear view mirror which is above the seating area provides the maximum field of view with minimal obstruction. Further, Mahbub's plan-view template [2D XY, YZ, or ZX plane images] which are used for classifying in the other hand are the *different projection perspective views* of the 3D {ROI} segmented image as discussed in paragraph [0088], and the claim doesn't state the type of transformation that could be used. Therefore the rejections are maintained. Further the new prior art references Beymer ("Person Counting Using Stereo" - 2000 IEEE) and Bramblet et al (US 2004/0017929 A1, cited by the Examiner in the PTO-892 filed 11/28/2008) are introduced in the 35 U.S.C. 103(a) rejections for showing certain aspects of the current

application's claimed invention as being obvious as will be further discussed below in the art rejections section.

The Applicant alleges, "35 U.S.C. 103(a) ..." in pages 16-20, and states respectively that the prior art references Carrot and Zhang teach away from the amended claim limitation of [respectively for each independent claim 1, 23 and 32] depth data for at least a pixel of an image of an object, which is not required to be inside of a subject. The Examiner agrees because Carrot and Zhang analyze breast tissue mammograms to detect and classify cancer lesions and tumors and therefore go away from the amended claim limitations because they require the object to be inside of the subject. Therefore the rejections under 103(a) which include the prior art reference Carrot and/or Zhang have been withdrawn.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 3, 4, 9, 12, 19-22, 23, and 25-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Mahbub (US 2002/0050924 A1, as applied in previous Office Action).

Re Claim 23: Mahbub discloses a visual-based recognition system / occupant sensing system comprising a visual sensor / CCD stereo vision system for capturing depth data /

3D image relating to distance for at least a pixel of an image of an object / seating area of a vehicle with possible occupant, which is not required to be inside of a subject / occupant (see [0045], lines 2-4, [0051], lines 1-3, [0081], lines 1-4, [0088], the object is not inside the subject / occupant), said depth data / 3D image comprising information relating to a distance / distance from said visual sensor / CCD stereo vision system to a portion of said object / seating area of vehicle with possible occupant visible at said pixel (see [0045], lines 2-4, [0051], lines 1-3, [0081], lines 1-4, [0088]), said visual sensor / CCD stereo vision system comprising an emitter and sensor of light (a CCD camera system inherently has an emitter and sensor of light), wherein said light is selected from the group of electromagnetic radiation consisting of visible light, infrared light, and ultraviolet light (a CCD camera system inherently operates under visible light) and wherein said capturing of said depth data does not require special behavior from one of said object and said subject (Mahbub doesn't require any special behavior from the object or subject / occupant when producing the 3D image); a plan-view image generator / segmentation of a scene for generating a plan-view image / segmented 3D image based on said depth data / 3D image components relating to distance (see [0051], lines 1-3, [0059], [0061], lines 3-6, [0088], the 3D image is segmented to remove background clutter using thresholding means with the 3D X Y and Z components which relate to the distance of the object to the imaging camera system), wherein said generating of said plan-view image / segmented 3D image includes generating said plan-view image as if said object / seating area of a vehicle with possible occupant were viewed from above / headliner above the rearview mirror (see Fig. 1b) and wherein

generating other view images based on different orientations of said object other than from above is not required / at least one imaging device wherein the imaging device is the headliner above the rearview mirror (see Mahbub, Figs. 1b and 2, [0040]-[0042] and [0056], at least one imaging device of the 3-D imaging system provides image data and this 3-D imaging system can be located at a variety of locations [e.g. 1. headliner, 2. pillar, 3. dashboard, the Examiner is considering only one is used because "at least one" is stated], Mahbub is suggesting different location alternatives from where the 3-D image data may be produced and therefore the Examiner is considering Mahbub's plan-view image to be the segmented 3D image from the headliner location [headliner has a fixed overhead location and a fixed overhead orientation] because the headliner above the rear view mirror which is above the seating area provides the maximum field of view with minimal obstruction); a plan-view template generator / 2D image generator for generating a plan-view template / 2D XY, YZ, or ZX plane images based on said plan-view image / segmented 3D image (see [0088], the segmented 3D image is projected to a 2D data set which will be used to classify for specific scenarios [e.g. occupant present, occupant not present, etc.], Mahbub's plan-view template [2D XY, YZ, or ZX plane images] which are used for classifying are the *different projection perspective views* of the 3D {ROI} segmented image as discussed in paragraph [0088] and the claim doesn't state the type of transformation that could be used); and a classifier / robust classifier for making a decision concerning recognition of said object / distinguish between scenarios, wherein said classifier is trained to make said decision according to pre-configured parameters / 2D features that were determined at least in part based on

a class assigned to said plan-view template / 2D XY, YZ or ZX plane images (see [0081], lines 1-4, [0088], [0111], the robust classifier trained with the 2D features [the different 2D features are represented by Central Moments, Normalized moments, invariant moments, perimeter, area, eccentricity, etc.] with respect to the 2D plane images classifies if there is an occupant in the seating area, occupant forward facing, occupant reverse facing, etc.).

As to claim 1, the claim is the corresponding method claim to claim 23 respectively. The discussions are addressed with regard to claim 23. Further Mahbub discloses receiving digital / CCD stereo vision system depth data / 3D image relating to distance (see Mahbub, [0045] at lines 2-4, [0051] at lines 1-3, [0081] at lines 1-4, [0088]); wherein at least a portion of said plan-view image / segmented 3D image is transformed (Mahbub's plan-view template [2D XY, YZ, or ZX plane images] which are used for classifying are the *different projection perspective views* of the 3D {ROI} segmented image as discussed in paragraph [0088], and the claim doesn't state the type of transformation that could be used); and processing that is executing on a computer system (see Mahbub, [0155]).

Re Claim 25: Mahbub further discloses wherein said visual sensor / CCD stereo vision system determines said depth data / 3D image relating to distance using stereopsis / stereo vision based on image correspondences (see [0045], lines 2-4, [0051], lines 1-3, [0081], lines 1-4, [0088]).

Re Claim 26: Mahbub further discloses said plan-view image generator comprises a pixel subset selector / ROI for selecting a subset of pixels of said image, wherein said pixel subset selector / ROI is operable to select said subset of pixels based on foreground segmentation / segmentation of scene (see [0059], the segmentation of a scene determines the region of interest ROI by removing and eliminating background clutter).

As to claims 3-4, the claims are the corresponding method claims to claims 25-26 respectively. The discussions are addressed with regard to claims 25-26.

Re Claim 9: Mahbub further discloses wherein said extracting said plan-view template from said plan-view image is based at least in part on object tracking (see [0059], the respective seating area is tracked and that respective area is extracted as a XY, YZ, or ZX plane image).

Re Claim 12: Mahbub further discloses said object is a person / occupant (see [0081], lines 1-4).

Re Claim 19: Mahbub further discloses wherein said decision is to distinguish between a human / occupant and a non-human / no occupant (see [0081], lines 1-4).

Re Claim 20: Mahbub further discloses wherein said decision is to distinguish between a plurality of different human body orientations / orientations (see [0126]-[0127]).

Re Claim 21: Mahbub further discloses wherein said decision is to distinguish between a plurality of different human body poses / orientations or actual occupancy (see [0081], lines 1-4, [0126]-[0127], the different body poses may be the different body orientations or just the presence or no presence of the human occupant).

Re Claim 22: Mahbub further discloses wherein said decision is to distinguish between a plurality of different classes of people / infant, occupant, child (see [0081], lines 1-4, the different classes of people may be the different type of humans such as an infant, child or adult occupant).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mahbub. The teachings of Mahbub have been discussed above.

Re Claim 6: Although Mahbub doesn't explicitly suggest receiving non-depth data for

said pixel, and wherein said foreground segmentation is based at least in part on said non-depth data, the Examiner takes Official Notice that it would have been exceedingly obvious to one of ordinary skill in the art at the time of the invention to modify Mahbub to have the CCD camera include non-depth / color information to perform foreground segmentation because such limitations are well known and typical in the digital image color segmentation processing field in order to allow only data of interest to be considered in the processing of image data.

10. Claims 10, 16, 17, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahbub in view of Li et al (US 2003/0108244 A1, as applied in previous Office Action). The teachings of Mahbub have been discussed above.

However, Mahbub fails to teach of fairly suggest that the classifier is a support vector machine and that the plan-view template is a vector basis obtained by principal component analysis (PCA).

Li, as recited in claim 16, discloses said plan-view template / frontal face view is represented in terms of a vector basis / SVM's (see page 1, paragraph [0008], lines 18-24, [0011], lines 4-7).

Li, as recited in claim 17, discloses said vector basis is obtained through principal component analysis (PCA) (see page 1, paragraph [0008], lines 18-24, "PCA as they rotate and use the SVM's").

Li, as recited in claim 27, discloses said classifier is a support vector machine / SVM's (see page 1, paragraph [0008], lines 18-24, "PCA as they rotate and use the SVM's for multi-pose face detection").

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mahbub's occupancy sensing system and method using Li's teachings by including the capabilities of having the classifier be a support vector machine and the plan-view template being a vector basis obtained by principal component analysis (PCA) in order to detect a person's face in input images containing either frontal or non-frontal views regardless of the scale or illumination conditions associated with the face (see [0011], lines 4-7).

As to claim 10, the claim is the corresponding method claim to claim 27 respectively. The discussions are addressed with regard to claim 27.

11. Claims 2, 11, 13, 14, 18, 24, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahbub in view of Bramblet et al (US 2004/0017929 A1, cited by the Examiner in the PTO-892 filed 11/28/2008). The teachings of Mahbub have been discussed above.

Re Claim 24: However Mahbub doesn't explicitly suggest wherein said visual sensor is also for capturing non-depth data.

Bramblet discloses wherein said visual sensor is also for capturing non-depth data / color information (see Bramblet, Fig. 3B, [0019], [0046], stereo pair of tracking cameras are placed overhead of the area of observation and color image analysis is used to help distinguish and classify multiple objects in an area of observation).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mahbub's system using Bramblet's teachings by including to Mahbub's depth capturing visual sensor Bramblet's color attributes of the image to improve the overhead of the area observation classification and tracking of objects (see Bramblet, Fig. 3B, [0019], [0046]).

Re Claim 28: Bramblet further discloses wherein said plan-view image is based in part on said non-depth data / color information (see Bramblet, Fig. 3B and 4C, [0019], [0046], stereo pair of tracking cameras are placed overhead of the area of observation and color image analysis is used to help distinguish and classify multiple objects in an area of observation, [0098], a 3D surface analysis provides an image with different colors representing the closeness to the camera system).

As to claims 2 and 11, the claims are the corresponding method claims to claims 24 and 28 respectively. The discussions are addressed with regard to claims 24 and 28.

Re Claim 13: However Mahbub doesn't explicitly suggest wherein said plan-view image / 3D image information comprises a value based at least in part on an estimate of height of a portion of said object above a surface.

Bramblet discloses wherein said plan-view image comprises a value based at least in part on an estimate of height / closeness to camera of a portion of said object above a surface (see Bramblet, Fig. 3B and 4C, [0019], [0046], stereo pair of tracking cameras are placed overhead of the area of observation and color image analysis is used to help distinguish and classify multiple objects in an area of observation, [0098], a 3D surface analysis provides an image with different colors representing the closeness to the camera system).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mahbub's system using Bramblet's teachings by including to Mahbub's depth capturing visual sensor Bramblet's surface analysis of the image to improve the overhead of the area observation classification and tracking of objects (see Bramblet, Fig. 3B and 4C, [0019], [0046], [0098]).

Re Claim 18: Bramblet further discloses performing height normalization on said plan-view template / 2D image representing closeness through different color representation [e.g. Fig. 4C] (see Bramblet, Fig. 3B and 4C, [0019], [0046], [0098], the closeness is considered as a height normalization as a result of the person being under the camera system, a 3D surface analysis provides an image with different colors representing the

closeness to the camera system which therefore is dependent upon the height normalization).

Re Claim 14: However Mahbub doesn't explicitly suggest wherein said plan-view image comprises a value based at least in part on color data for a portion of said object..

Bramblet discloses wherein said plan-view image comprises a value based at least in part on color data / color information for a portion of said object (see Bramblet, Fig. 3B and 4C, [0019], [0046], stereo pair of tracking cameras are placed overhead of the area of observation and color image analysis is used to help distinguish and classify multiple objects in an area of observation, [0098], a 3D surface analysis provides an image with different colors representing the closeness to the camera system).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mahbub's system using Bramblet's teachings by including to Mahbub's depth capturing visual sensor Bramblet's color attributes of the image to improve the overhead of the area observation classification and tracking of objects (see Bramblet, Fig. 3B, [0019], [0046]).

12. Claims 5, 7, 15, 29-31, 32, 34-37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahbub in view of Beymer ("Person Counting Using Stereo" - 2000 IEEE). The teachings of Mahbub have been discussed above.

Re Claim 29: However Mahbub doesn't explicitly suggest wherein said plan-view image generator is operable to generate a three-dimensional point cloud based on said depth data, wherein a point of said three-dimensional point cloud comprises a three-dimensional coordinate.

Beymer discloses wherein said plan-view image generator / segmented 3D image is operable to generate a three-dimensional point cloud based on said depth data / Z field in the 3D X, Y, Z image, wherein a point of said three-dimensional point cloud / 3D volume of interest (3D VOI) comprises a three-dimensional coordinate / X, Y, Z (see Beymer, abstract, Figs. 1 and 3, Sections 4 Tracking in occupancy maps and 4.1 Occupancy maps, the 3D reconstruction from stereo from an above head camera system allows a three-dimensional volume of interest VOI to be analyzed).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mahbub's system using Beymer's teaching by including the segmentation of 3D VOI to Mahbub's plan-view image [segmented 3D image] in order to improve the tracking of people by focusing the computation on the heads and torsos of the people (see Beymer, abstract, Figs. 1 and 3, Sections 4 Tracking in occupancy maps and 4.1 Occupancy maps).

Re Claim 30: Beymer further discloses wherein said plan-view image generator / segmented 3D image is operable to divide said three-dimensional point cloud / 3D volume of interest (3D VOI) into a plurality of slices / different buckets that a plan-view image may be generated for at least one slice of said plurality of slices (see Beymer,

abstract, Figs. 1 and 3, Sections 4 Tracking in occupancy maps and 4.1 Occupancy maps, the 3D VOI is generated by the different buckets).

Re Claim 31: Beymer further discloses wherein said plan-view template generator / occupancy orthographic map is operable to extract a plan-view template / occupancy orthographic map from at least two plan-view images corresponding to different slices of said plurality of slices / different buckets, wherein said plan-view template comprises a transformation of at least said portion of said plan-view images, such that said plan-view template is processed at said classifier / tacking (see Beymer, abstract, Figs. 1 and 3, Sections 4 Tracking in occupancy maps and 4.1 Occupancy maps, the different buckets of the 3D VOI are projected to the orthographic map as seen as the 2D image in Fig. 3a where the entire area of the person is drawn as a enclosing circle and this occupancy orthographic map is used for tracking of the person).

Re Claim 15: However Mahbub doesn't explicitly suggest said plan-view image comprises a value based at least in part on a count of pixels obtained by said visual sensor and associated with said object.

Beymer discloses said plan-view image / segmented 3D image comprises a value based at least in part on a count of pixels / 3D VOI obtained by said visual sensor / camera system and associated with said object (see Beymer, abstract, Figs. 1 and 3, Sections 4 Tracking in occupancy maps and 4.1 Occupancy maps, the 3D VOI has a certain amount or count of pixels).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mahbub's system using Beymer's teaching by including the segmentation of 3D VOI to Mahbub's plan-view image [segmented 3D image] in order to improve the tracking of people by focusing the computation on the heads and torsos of the people (see Beymer, abstract, Figs. 1 and 3, Sections 4 Tracking in occupancy maps and 4.1 Occupancy maps).

Re Claim 5: However Mahbub doesn't explicitly suggest generating a three-dimensional point cloud of a subset of pixels based on said depth data, wherein a point of said three-dimensional point cloud comprises a three-dimensional coordinate; partitioning said three-dimensional point cloud into a plurality of vertically oriented bins; and mapping at least a portion of points of said plurality of vertically oriented bins into at least one said plan-view image based on said three-dimensional coordinates, wherein said plan-view image is a two-dimensional representation of said three-dimensional point cloud comprising at least one pixel corresponding to at least one vertically oriented bin of said plurality of vertically oriented bins.

Beymer discloses generating a three-dimensional point cloud of a subset of pixels / 3D volume of interest (3D VOI) based on said depth data / Z field in the 3D X, Y, Z image, wherein a point of said three-dimensional point cloud comprises a three-dimensional coordinate / X, Y, Z (see Beymer, abstract, Figs. 1 and 3, Sections 4 Tracking in occupancy maps and 4.1 Occupancy maps, the 3D reconstruction from stereo from an above head camera system allows a three-dimensional volume of

interest VOI to be analyzed); partitioning said three-dimensional point cloud into a plurality of vertically oriented bins / vertical buckets (see Beymer, Figs. 3a and 3b, Sections 4 Tracking in occupancy maps and 4.1 Occupancy maps, the 3D VOI is partitioned into vertical bins / buckets); and mapping at least a portion of points of said plurality of vertically oriented bins into at least one said plan-view image / occupancy orthographic map based on said three-dimensional coordinates, wherein said plan-view image is a *two-dimensional* representation of said three-dimensional point cloud / 3D VOI comprising at least one pixel corresponding to *at least one* vertically oriented bin of said plurality of vertically oriented bins / the different vertical buckets (see Beymer, abstract, Figs. 1 and 3, Sections 4 Tracking in occupancy maps and 4.1 Occupancy maps, the different buckets of the 3D VOI are projected to the orthographic map as seen as the 2D image in Fig. 3a where the entire area of the person is drawn as an enclosing circle and this occupancy orthographic map is used for tracking of the person).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mahbub's system using Beymer's teaching by including the segmentation of 3D VOI to Mahbub's plan-view image [segmented 3D image] in order to improve the tracking of people by focusing the computation on the heads and torsos of the people (see Beymer, abstract, Figs. 1 and 3, Sections 4 Tracking in occupancy maps and 4.1 Occupancy maps).

Re Claim 7: Beymer further discloses dividing said three-dimensional point cloud / 3D volume of interest (3D VOI) into a plurality of slices / buckets, wherein said generating said plan-view image / occupancy orthographic map is performed for *at least one* slice of said plurality of slices / different buckets (see Beymer, abstract, Figs. 1 and 3, Sections 4 Tracking in occupancy maps and 4.1 Occupancy maps, the different buckets of the 3D VOI are projected to the orthographic map as seen as the 2D image in Fig. 3a where the entire area of the person is drawn as an enclosing circle and this occupancy orthographic map is used for tracking of the person).

As to claim 32, the discussions are addressed with respect to claims 1 and 4-5.

As to claim 34, the discussions are addressed with respect to claim 3.

As to claim 35, the discussions are addressed with respect to claim 1.

As to claim 36, the discussions are addressed with respect to claim 7.

As to claim 37, the discussions are addressed with respect to claim 1.

As to claim 39, the discussions are addressed with respect to claim 4.

13. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mahbub, as modified by Beymer, and further in view of Bramblet. The teachings of Mahbub as modified by Beymer have been discussed above.

Re Claim 33: Mahbub as modified by Beymer discloses said three-dimensional point cloud and said plan-view image as discussed in claim 32 for example.

However Mahbub as modified by Beymer doesn't explicitly suggest wherein said images are at least in part on non-depth data.

Bramblet discloses wherein said visual sensor is also for capturing non-depth data / color information (see Bramblet, Fig. 3B, [0019], [0046], stereo pair of tracking cameras are placed overhead of the area of observation and color image analysis is used to help distinguish and classify multiple objects in an area of observation).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Mahbub's system, as modified by Beymer, using Bramblet's teachings by including Bramblet's color attributes of the image to the visual sensor in order to improve the overhead of the area observation classification and tracking of objects (see Bramblet, Fig. 3B, [0019], [0046]).

14. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mahbub, as modified by Beymer, and further in view of Li. The teachings of Mahbub as modified by Beymer have been discussed above.

Re Claim 38: However Mahbub as modified by Beymer doesn't explicitly suggest wherein said classifier is a support vector machine.

Li discloses said classifier is a support vector machine / SVM's (see page 1, paragraph [0008], lines 18-24, "PCA as they rotate and use the SVM's for multi-pose face detection").

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Mahbub's occupancy sensing system and method, as modified by Beymer, using Li's teachings by including the capabilities of having the classifier be a support vector machine and the plan-view template being a vector basis obtained by principal component analysis (PCA) in order to detect a person's face in input images containing either frontal or non-frontal views regardless of the scale or illumination conditions associated with the face (see [0011], lines 4-7).

Allowable Subject Matter

15. Although claims 29-31 are very similar in language to claims 5, 7, and 8, claim 8 however is different when compared to claim 31 because claim 5 [claim 5 is a base claim to claim 7, and claim 7 is a base claim to claim 8] is more narrower than claim 29 resulting in different claim interpretations for the two sets of claims. *Therefore, only claim 8 [and not claim 31, claim 31 stands rejected] is objected to as being dependent upon a rejected base claim*, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Similarly, claim 40 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard Krasnic whose telephone number is (571) 270-1357. The examiner can normally be reached on Mon-Thur 8:00am-4:00pm and every other Friday 8:00am-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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May 26, 2009